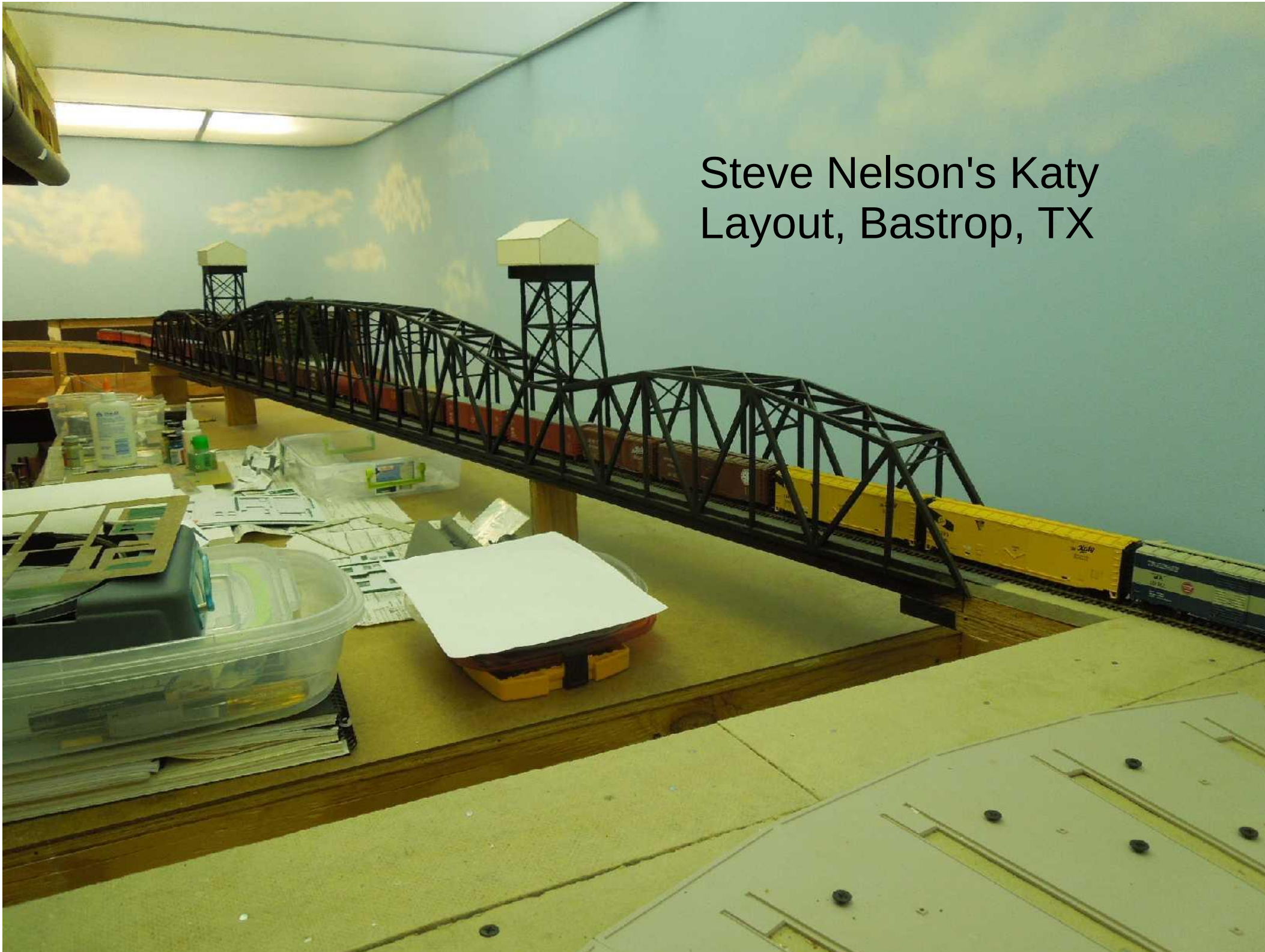
LSR Convention, 2014
Mike Barrett

Modeling Long Bridges, Part 1

a. Steel Arch Bridge
b. Fixed-Fixed Steel Beam Inside Shell

Modeling Long Bridges, Part 2

Building Howe Thru-Truss Bridges
of any Size or Scale


Steve Nelson's Katy
Layout, Bastrop, TX


ELMER'S
Glue-All


SOUTHERN
40218
FRISCO

What's on the back side of the mountain.

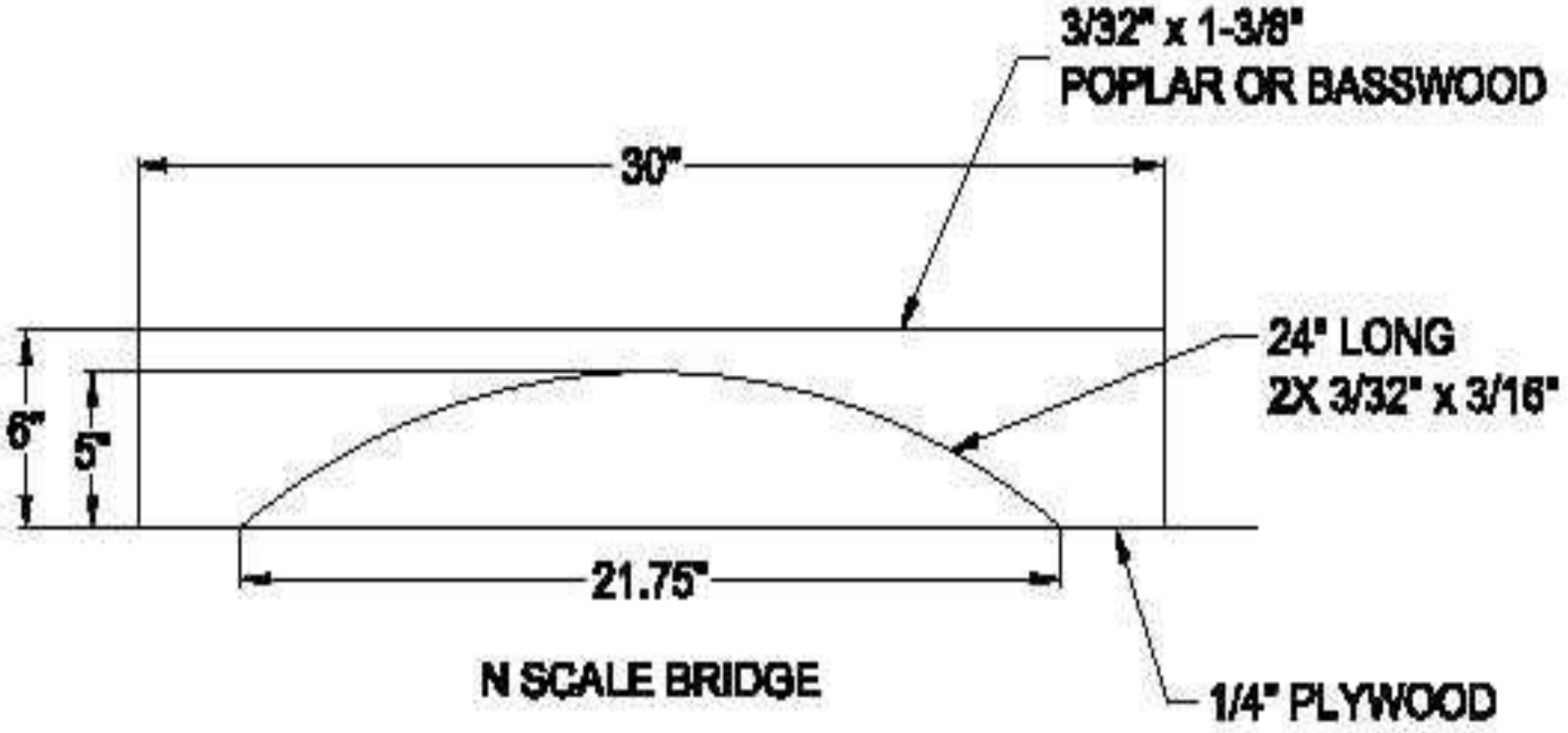
HO Scale Double Bridge

Height (7.5”) and span (48”) are set.

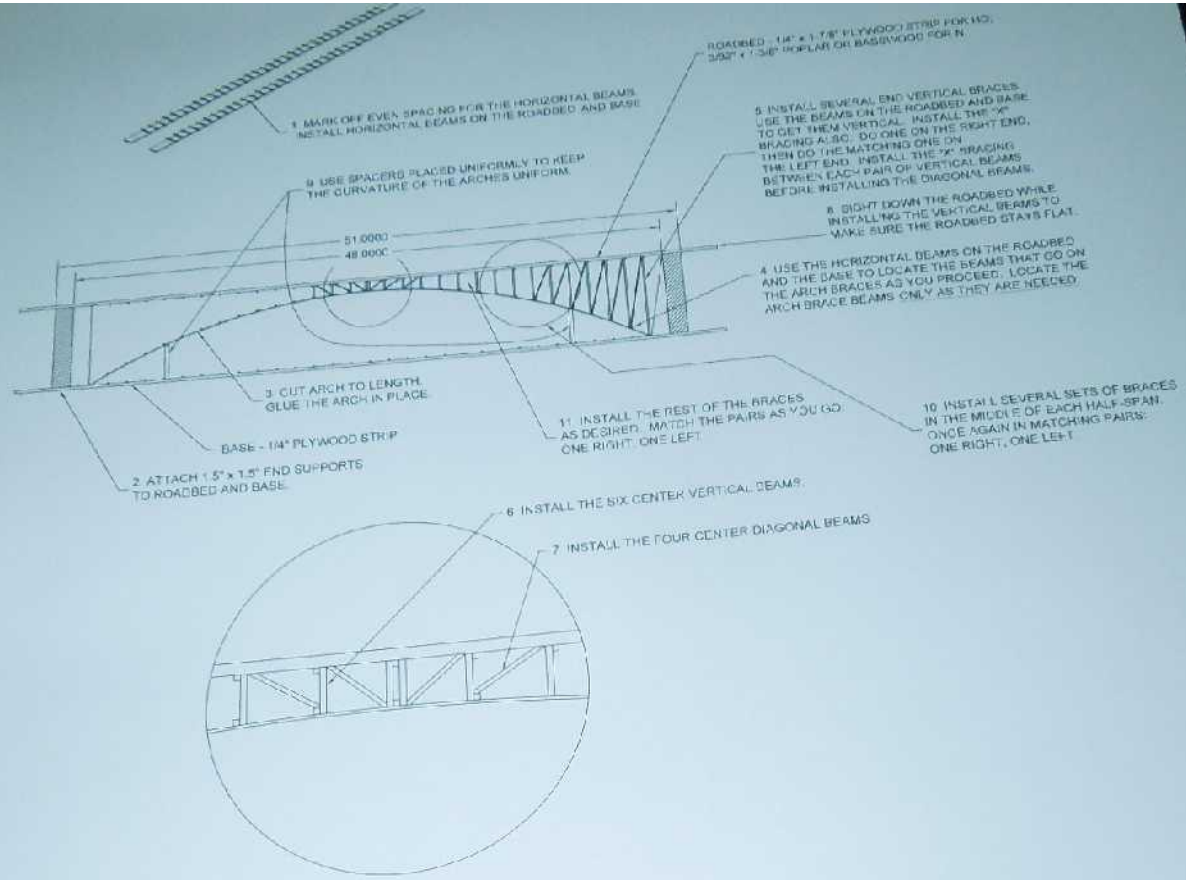
Length of arched piece a variable.

N Scale Standalone Bridge

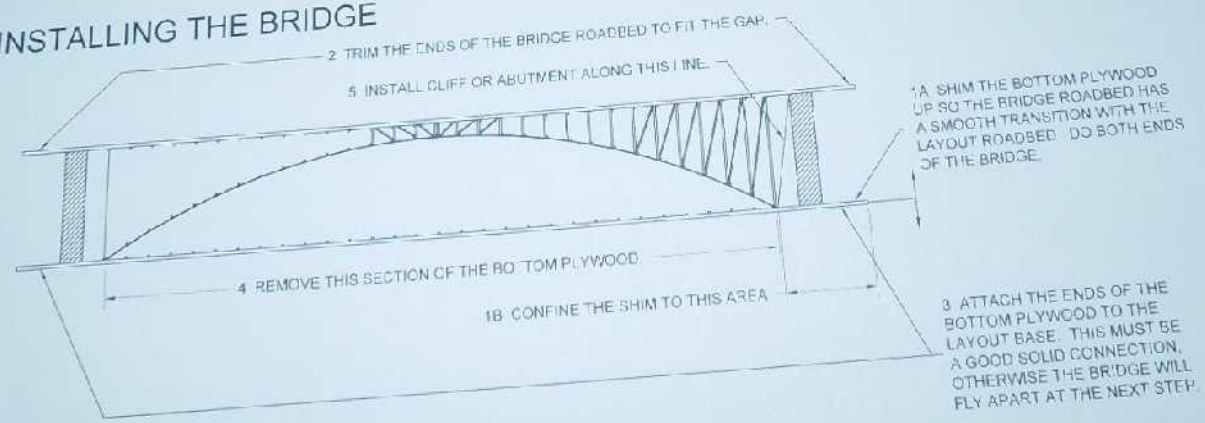
Length of arched piece (24”) is only parameter set.



N SCALE BRIDGE

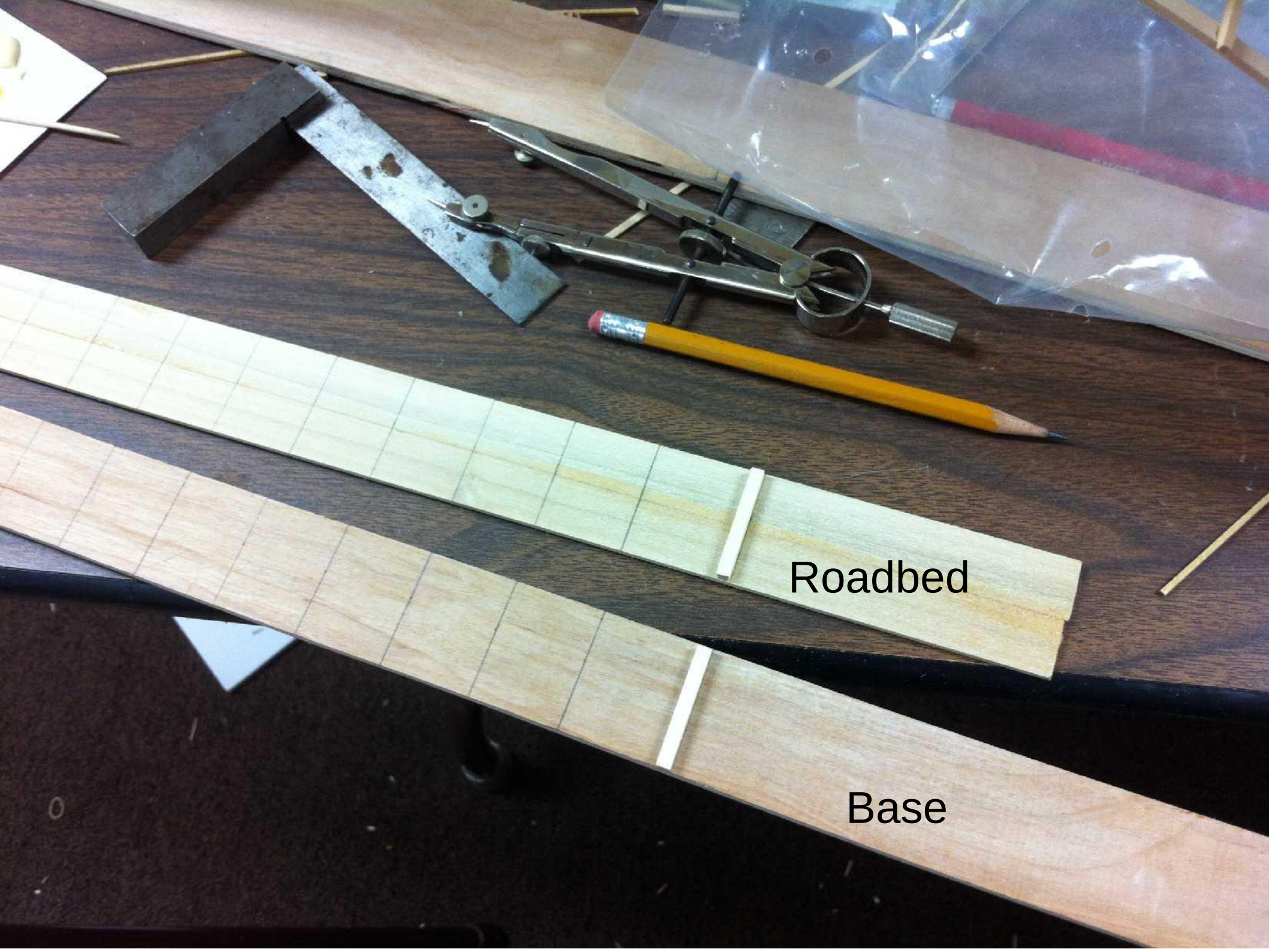


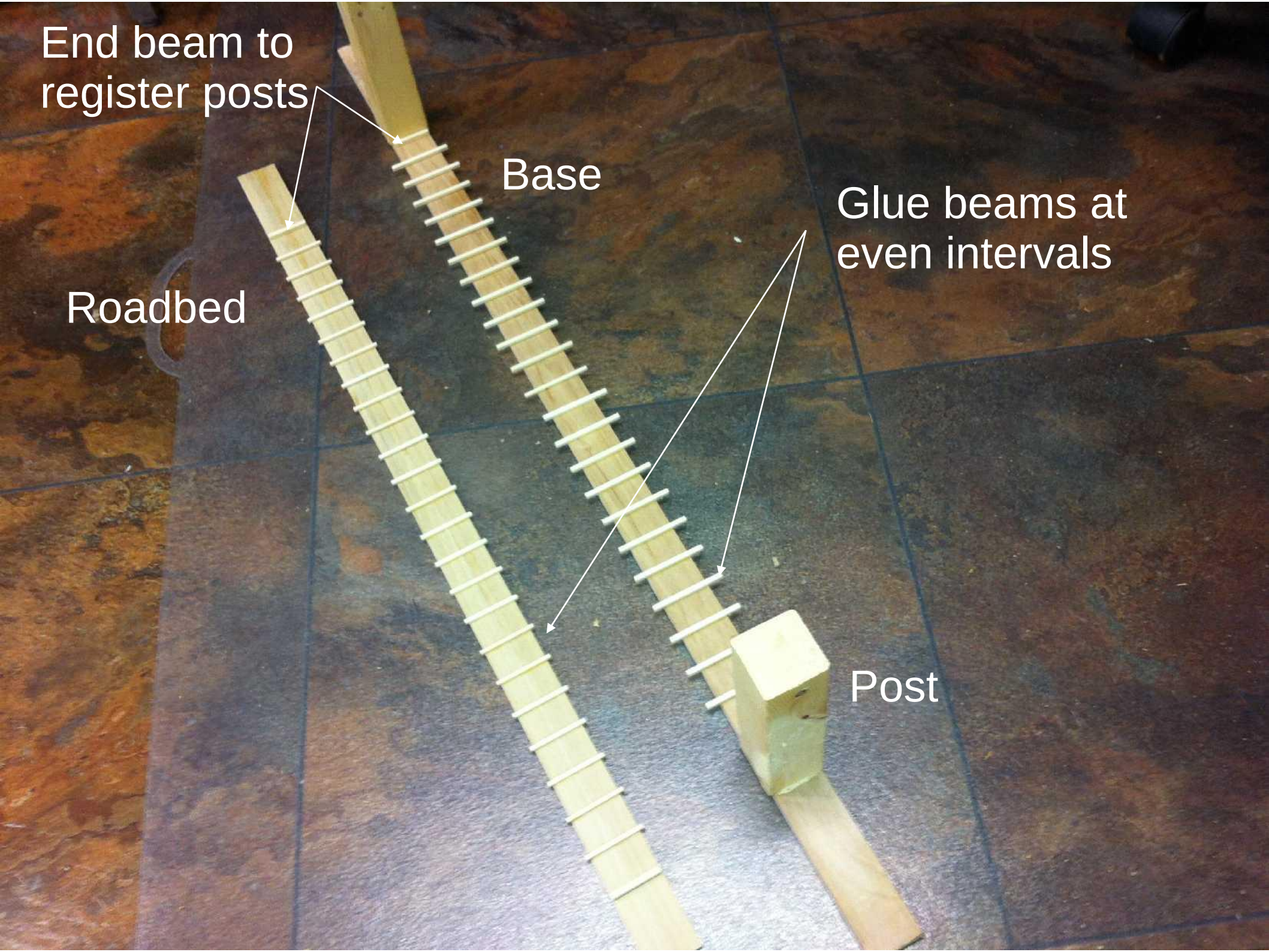
INSTALLING THE BRIDGE

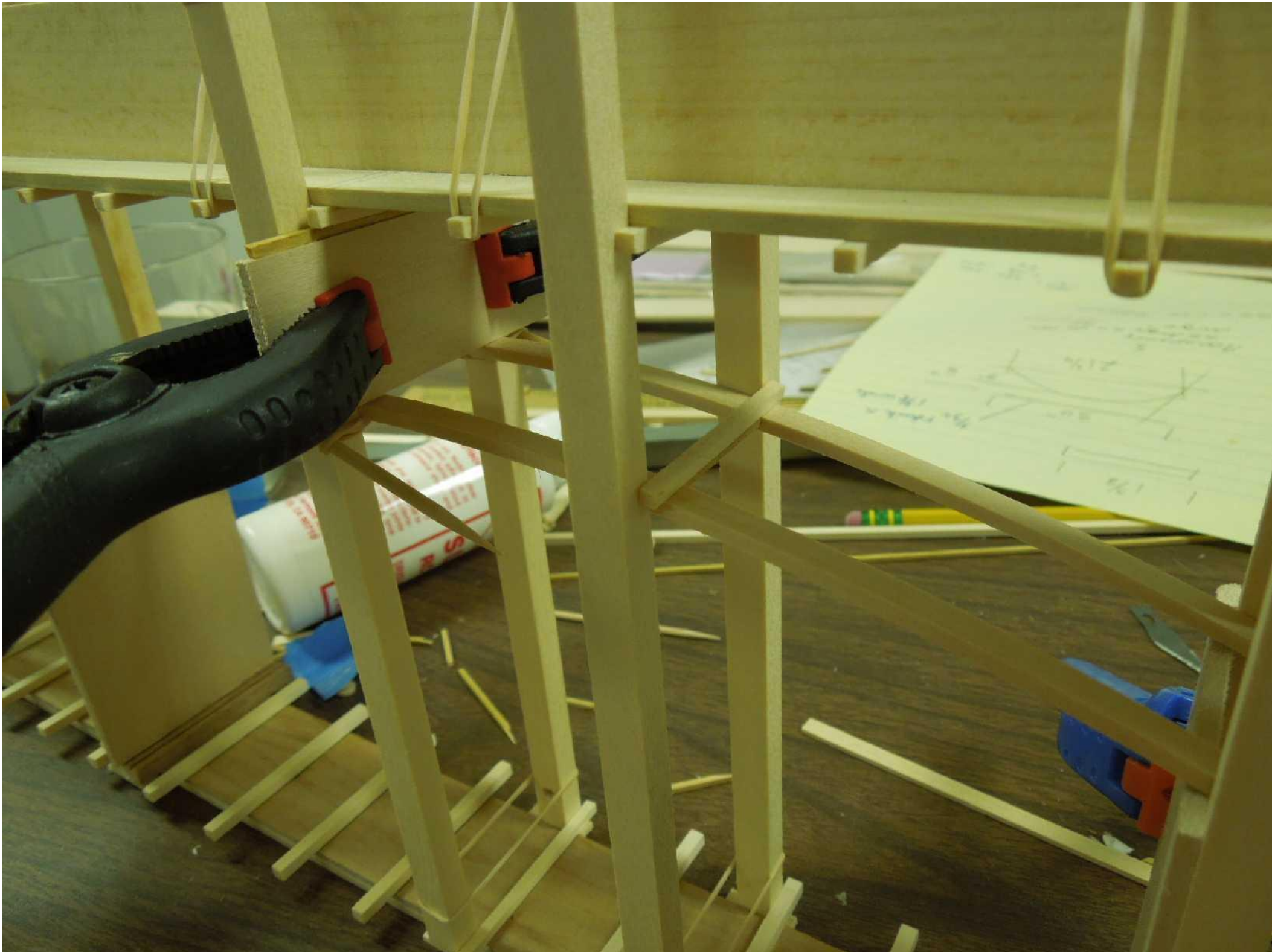


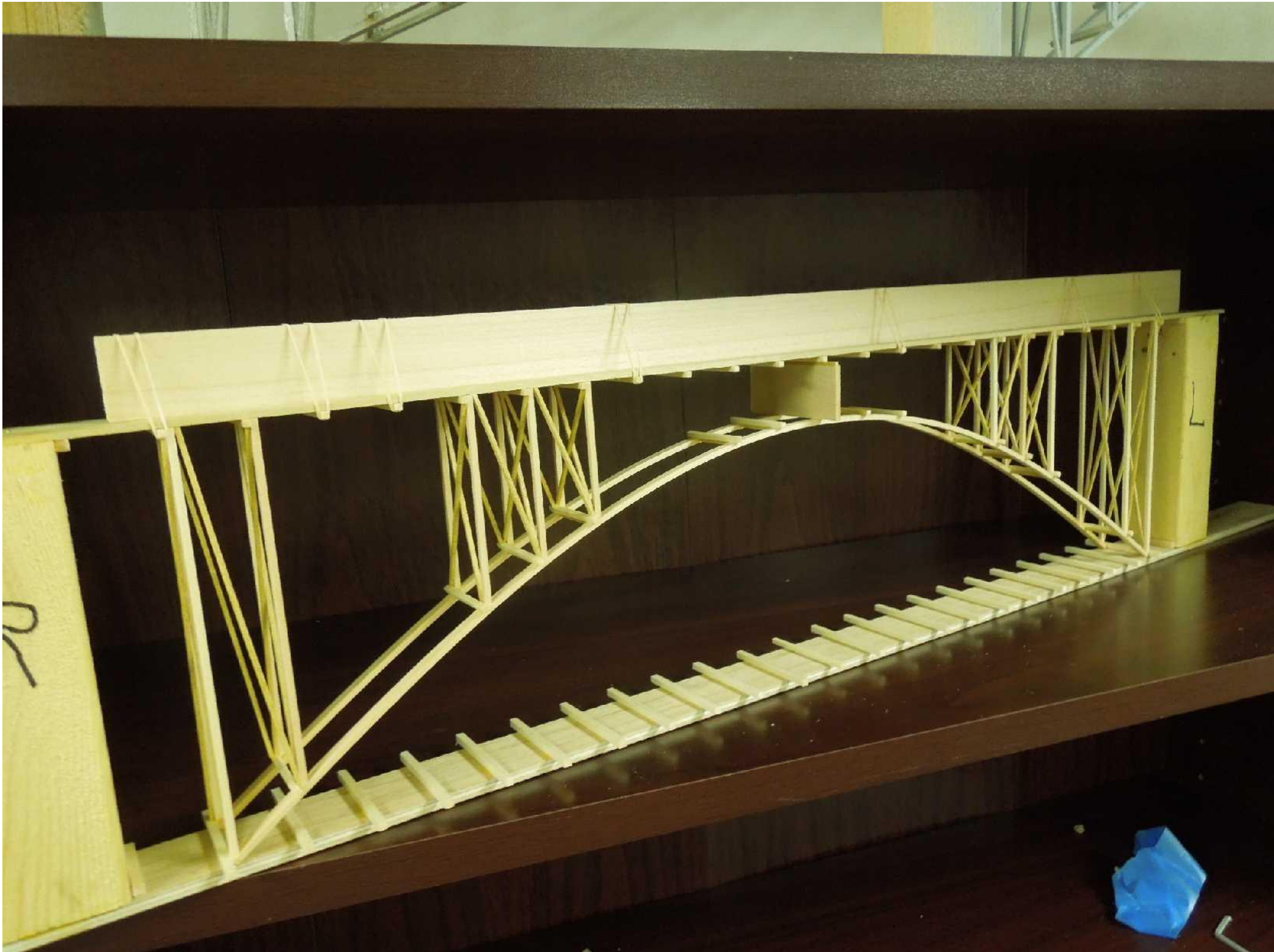
MODELING A LONG STEEL ARCH BRIDGE

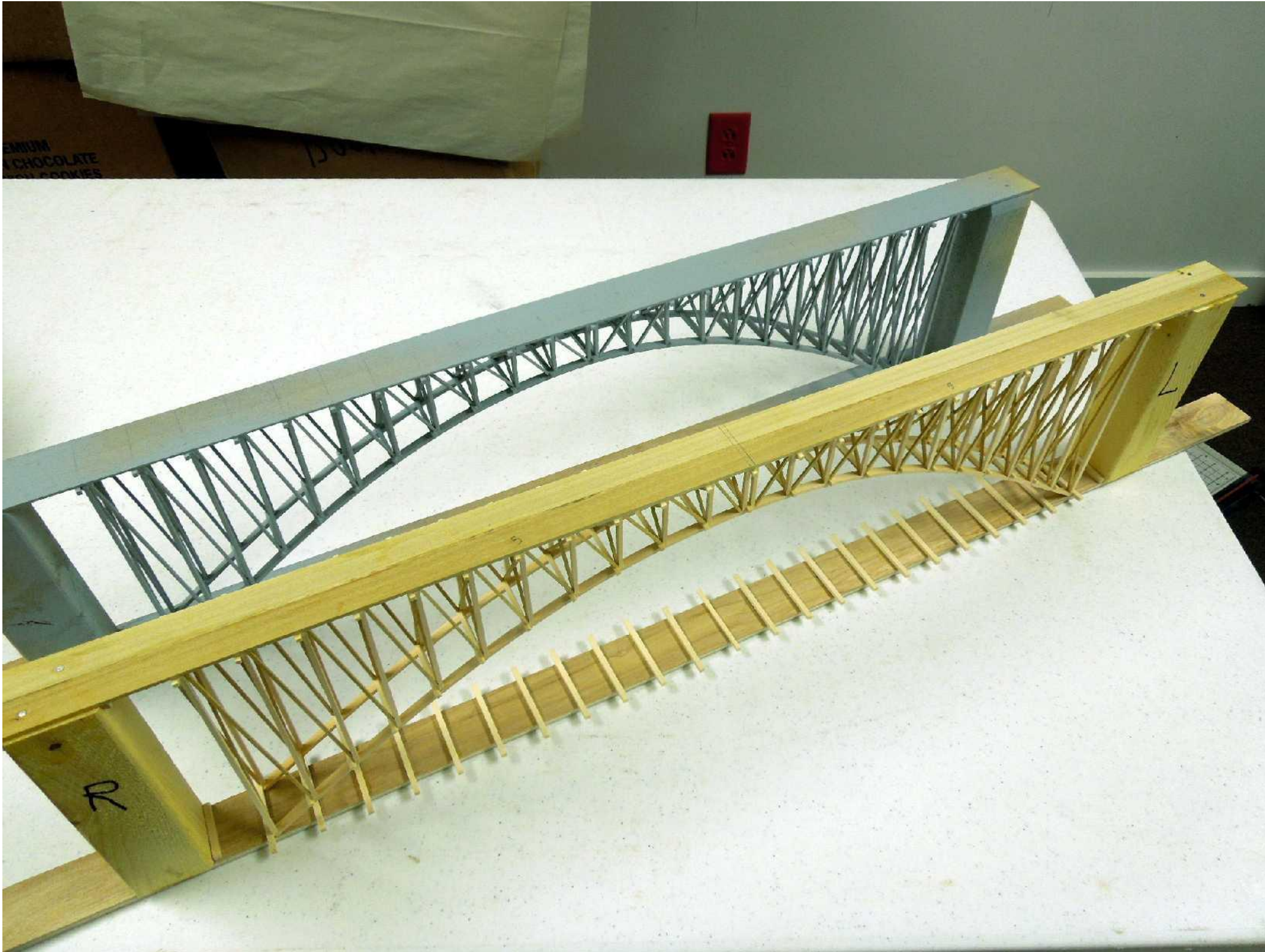
MIKE BARRETT, 2014 LSR CONVENTION


Roadbed
Base


End beam to register posts
Base
Glue beams at even intervals
Roadbed
Post

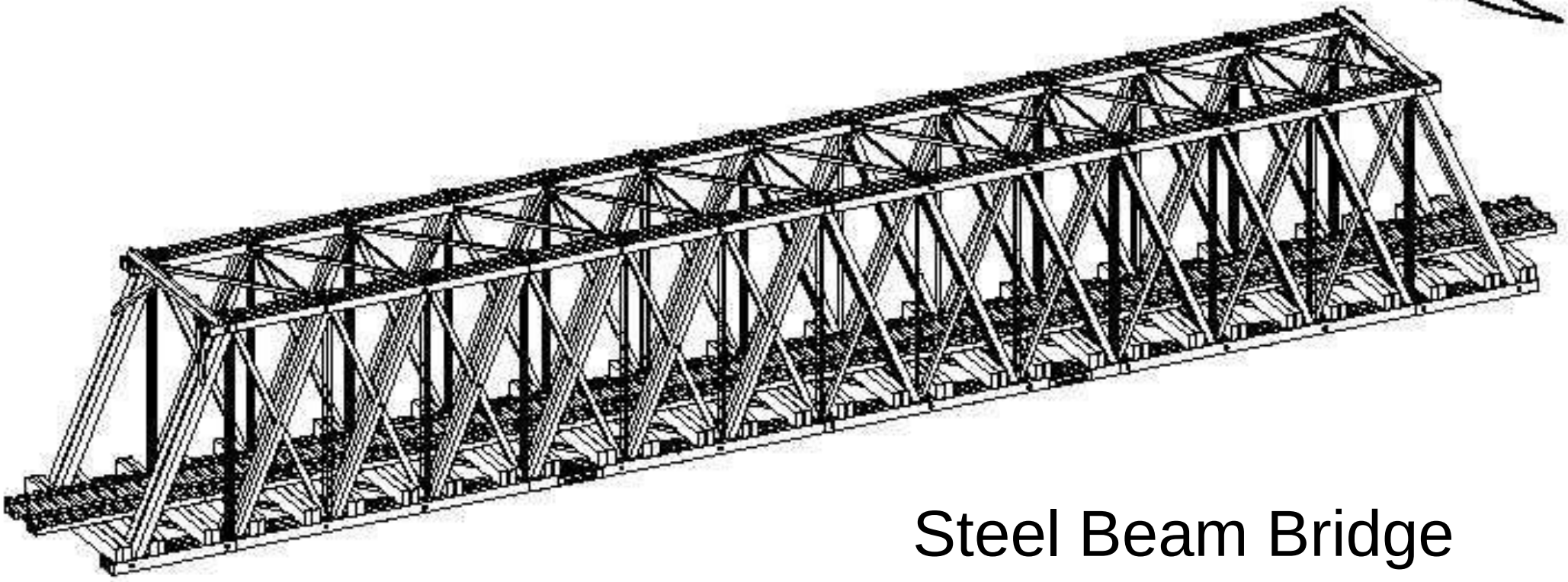





R
L

That kind of bridge isn't that long.

I don't care. I like the way it looks.

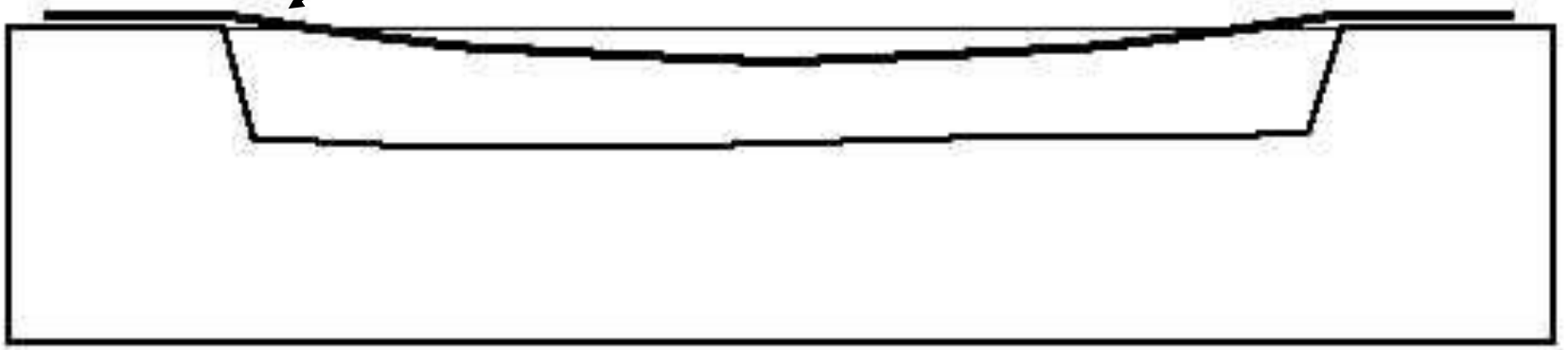


Steel Beam Bridge

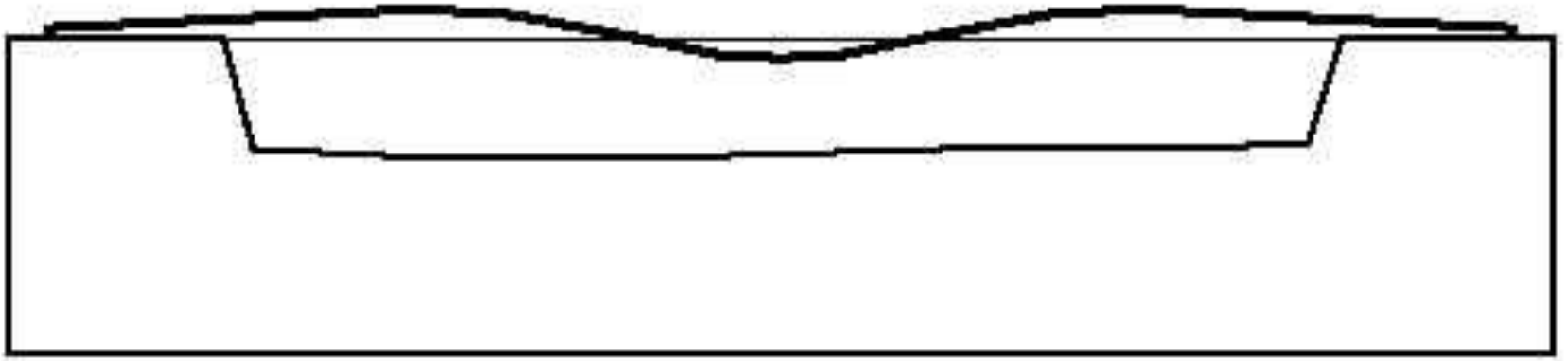

Shiner
BOCK

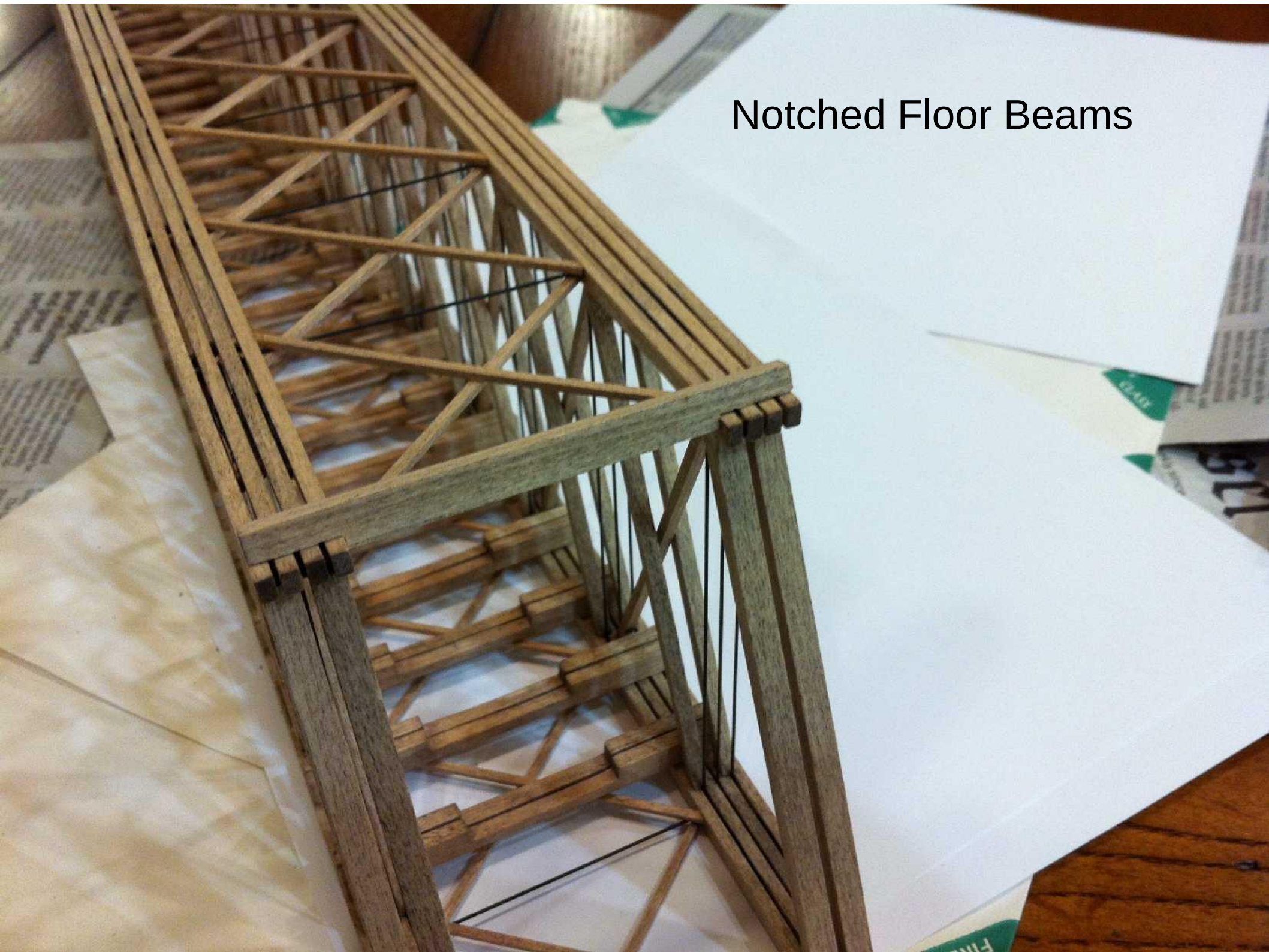

WABASH

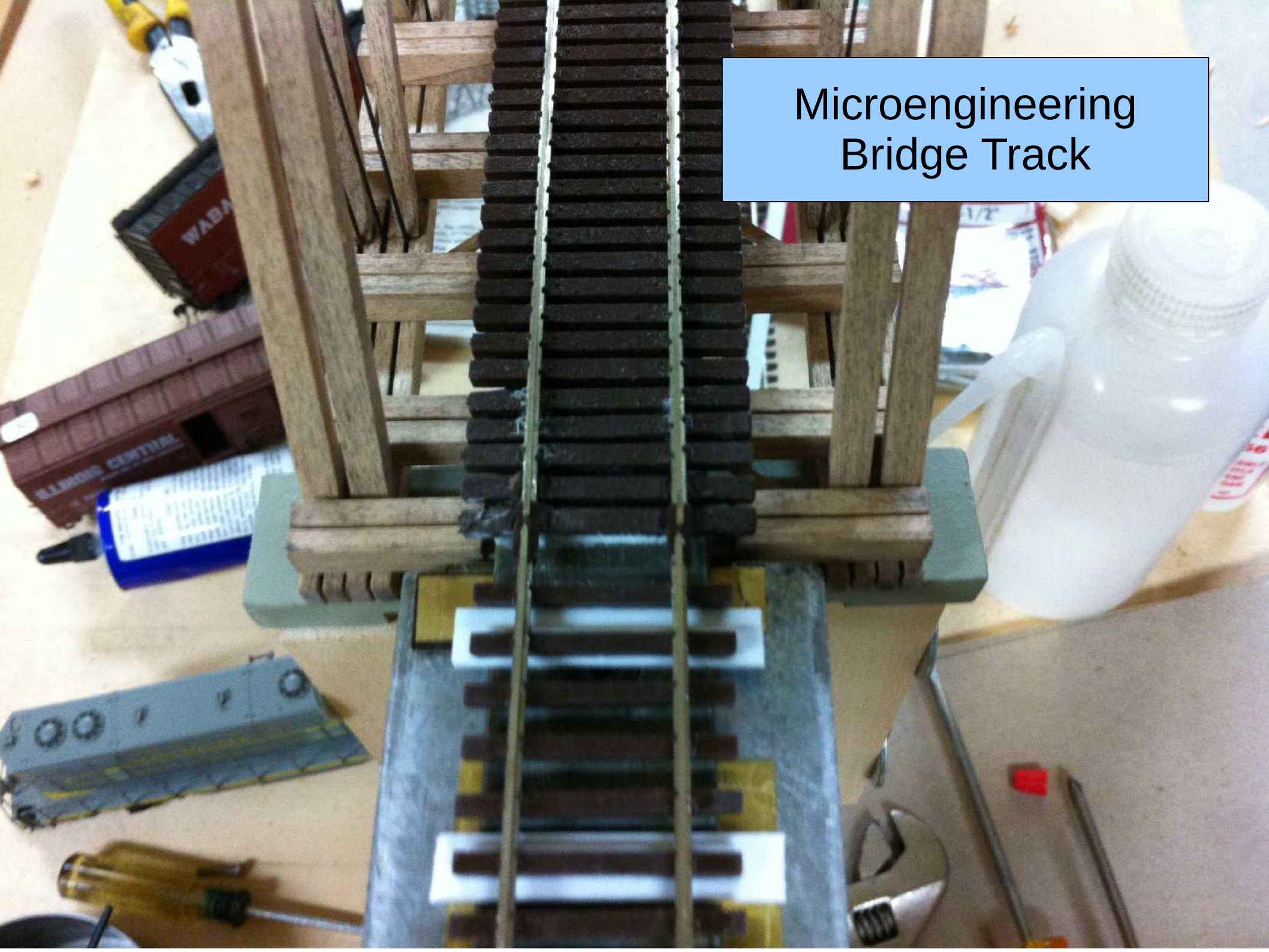
Beam Bridge

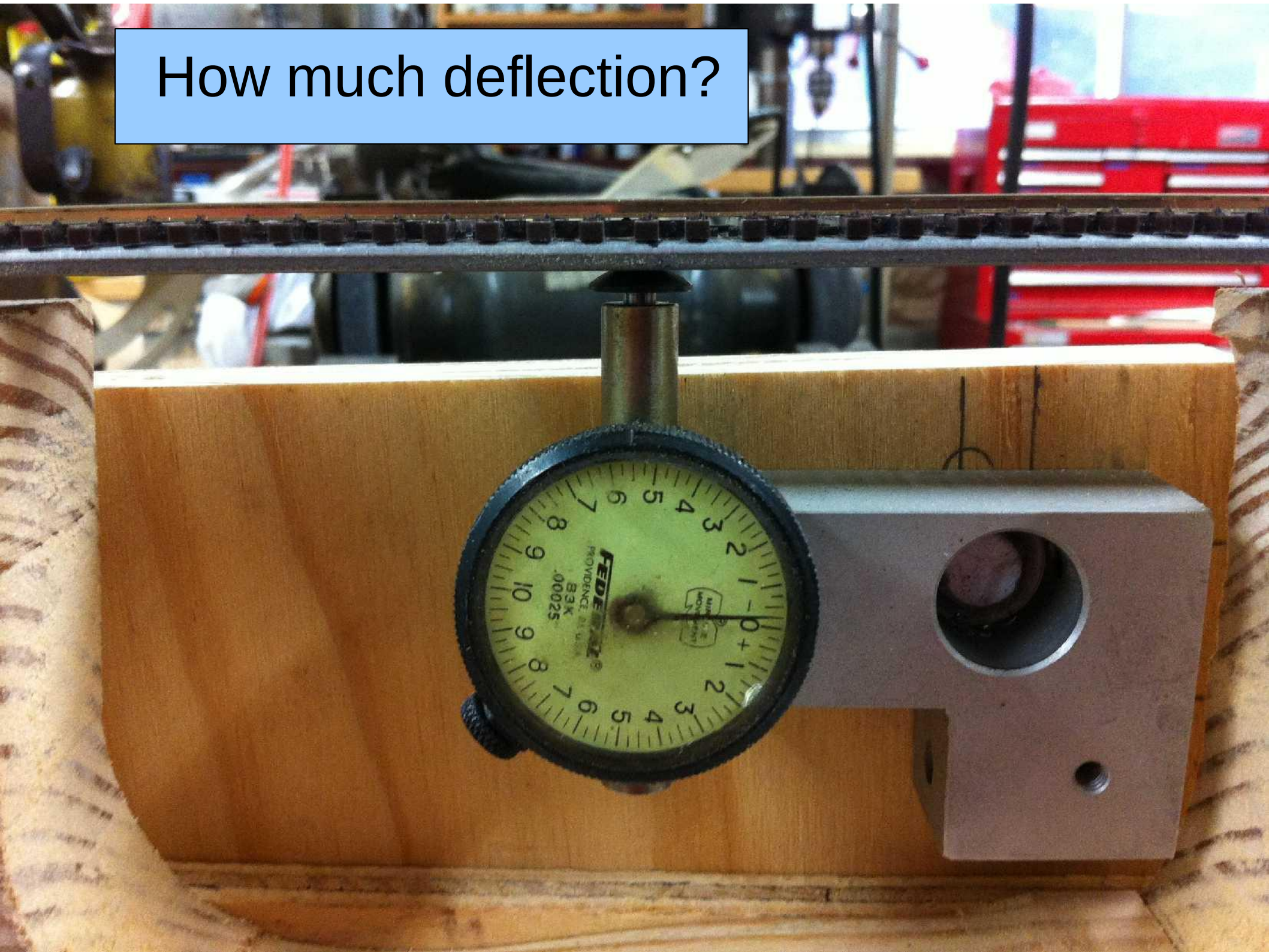


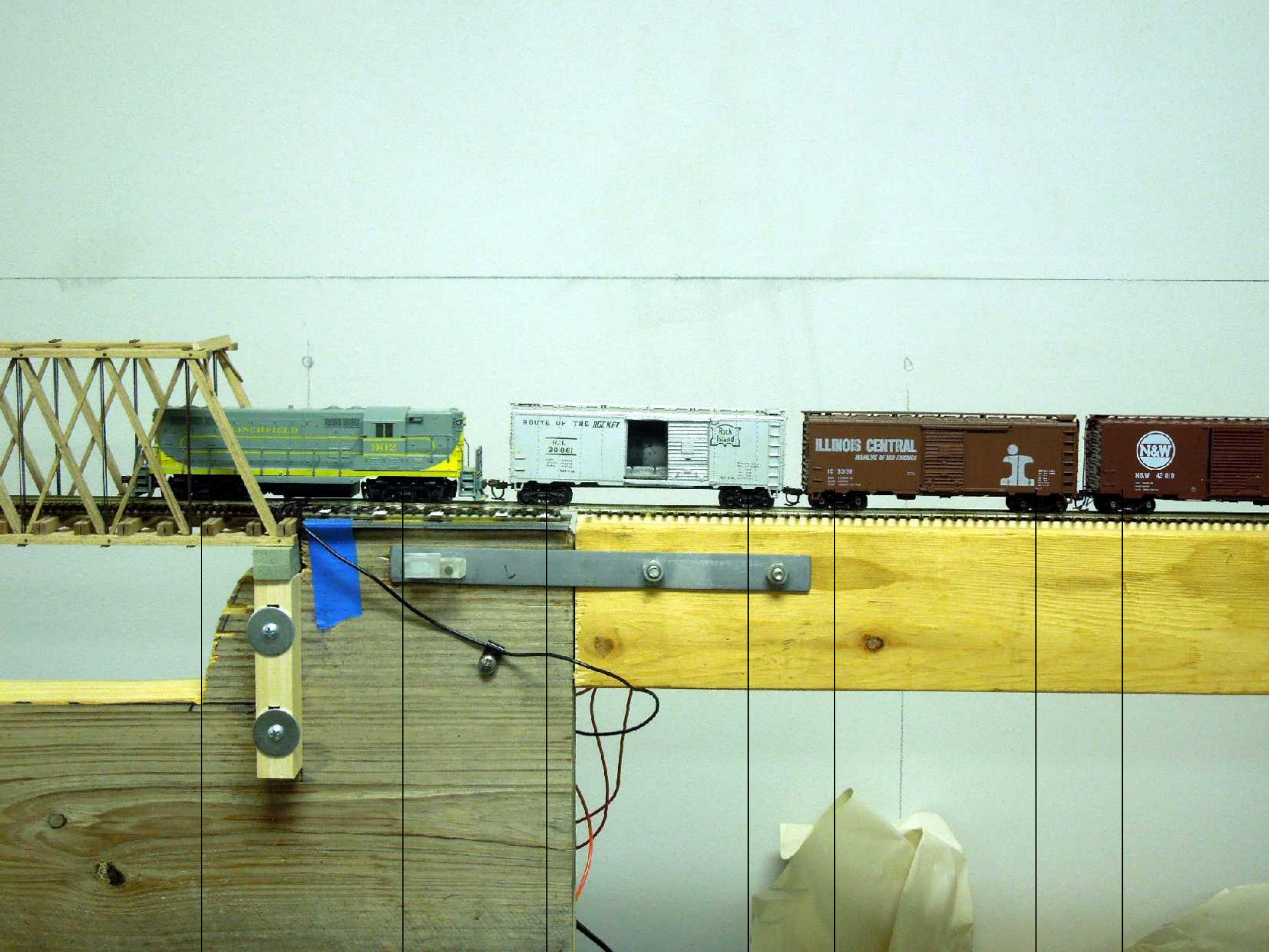
Shim the ends

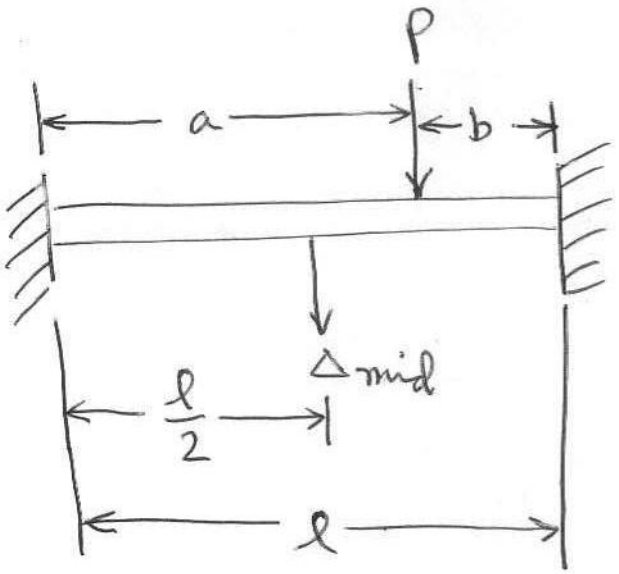



Notched Floor Beams


Microengineering
Bridge Track


How much deflection?
FEDERAL
PROVIDENCE
83K
.0025


ROUTE OF THE ROCKET
Rock Island
ILLINOIS CENTRAL
N&W



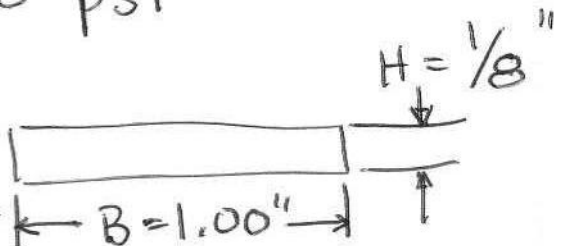
BEAM FIXED AT BOTH ENDS
CONCENTRATED LOAD AT ANY POINT

$$\Delta_{mid} = \frac{Pb^2}{48EI}(3a-b)$$

for $\frac{\ell}{2} \le a \le \ell$

$E = 30{,}000{,}000$ psi

$I = \frac{1}{12}BH^3$.



$I = .0001628\ IN^4$

$P = .250^{\#}, .125^{\#}$

$b = 1, 2, 3, \ldots, 18$ in

$a = 35, 34, 33, \ldots, 18$ in

				36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20
				0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1/8 lb	1/2 lb																		
											'-O--O----------O--O'----------'-O--O----									
7	2.09	8.36	49.41								8.36					18.43			5.76	
										'-O--O----------O--O'----------'-O--O----										
6	1.61	6.45	47.01							6.45					16.52			5.44		
									'-O--O----------O--O'----------'-O--O----											
5	1.17	4.69	44.50						4.69					14.51			5.05			
								'-O--O----------O--O'----------'-O--O----												
4	0.79	3.14	41.93					3.14					12.44			4.61				
							'-O--O----------O--O'----------'-O--O----													
3	0.46	1.84	39.37				1.84					10.38			4.13					6.01
						'-O--O----------O--O'----------'-O--O----														
2	0.21	0.85	36.90			0.85					8.36			3.63					5.76	
					'-O--O----------O--O'----------'-O--O----															
1	0.06	0.22	34.63		0.22					6.45			3.11					5.44		6.01
				'-O--O----------O--O'----------'-O--O----																
0		0	32.65	0					4.69			2.59					5.05		5.76	
		Meas	Calc	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Inches from end	mils Measured Deflection	mils Calculated Deflection		Inches from end	mils Measured Deflection	mils Calculated Deflection
1	1.75	0.22		19	51.75	52.93
2	2.25	0.85		20	54.00	54.94
3	3.25	1.84		21	56.50	56.38
4	5.25	3.14		22	57.30	57.25
5	5.50	4.69		23	59.50	57.57
6	7.25	6.67		24	59.00	57.34
7	9.75	9.22		25	59.75	56.58
8	12.75	12.22		26	59.50	55.34
9	17.00	15.64		27	57.75	53.66
10	20.75	19.41		28	56.75	51.64
11	23.00	23.43		29	53.50	49.41
12	27.75	27.58		30	53.75	47.01
13	31.50	31.74		31	51.00	44.50
14	34.75	35.85		32	51.00	41.93
15	38.80	39.85		33	51.20	39.37
16	42.50	43.66		34	48.75	36.90
17	45.25	47.20		35	41.25	34.63
18	49.00	50.33		36	39.00	32.65

One pound locomotive and three 4 oz. cars